

Facial Recognition and Racial Bias

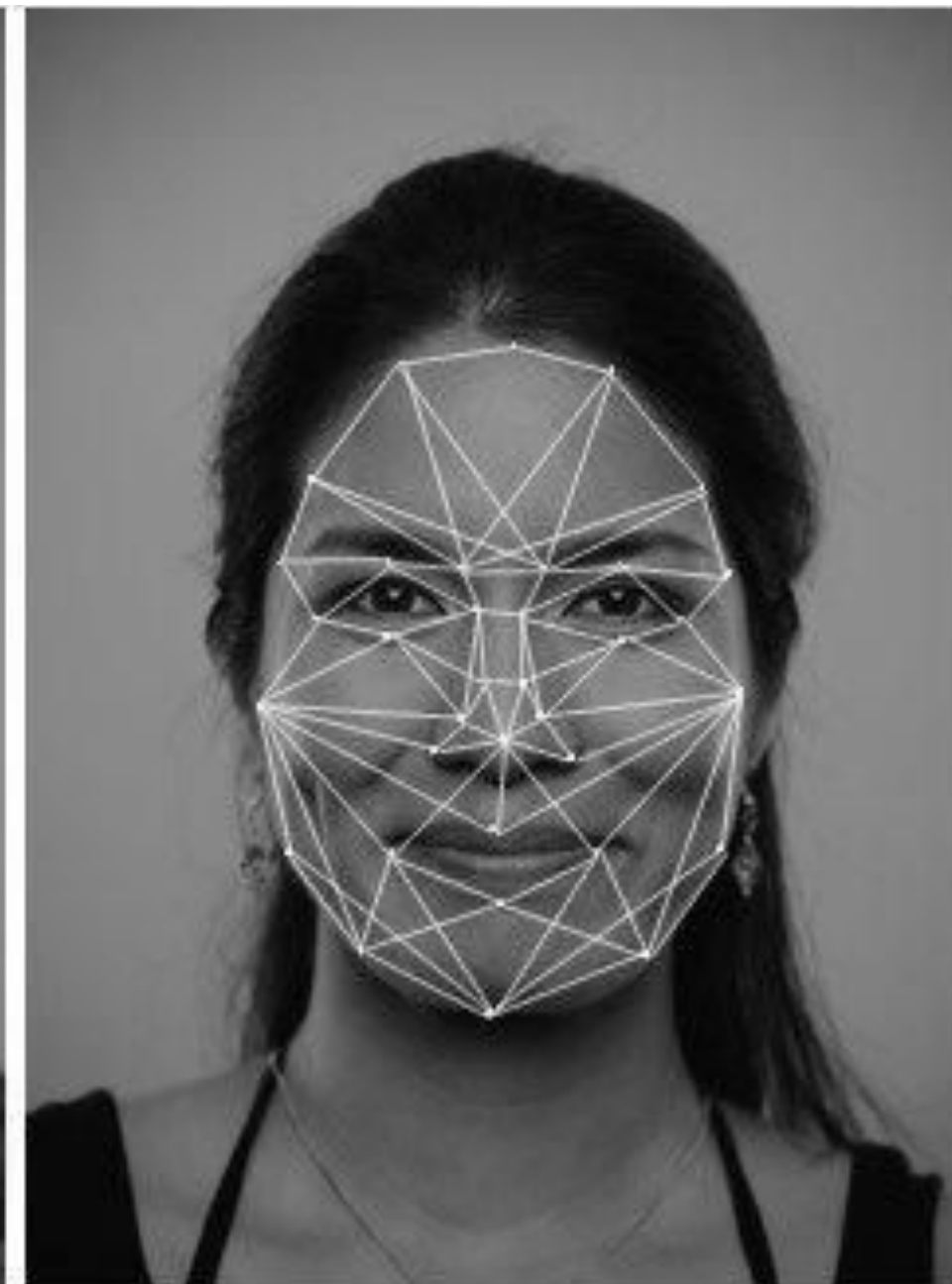
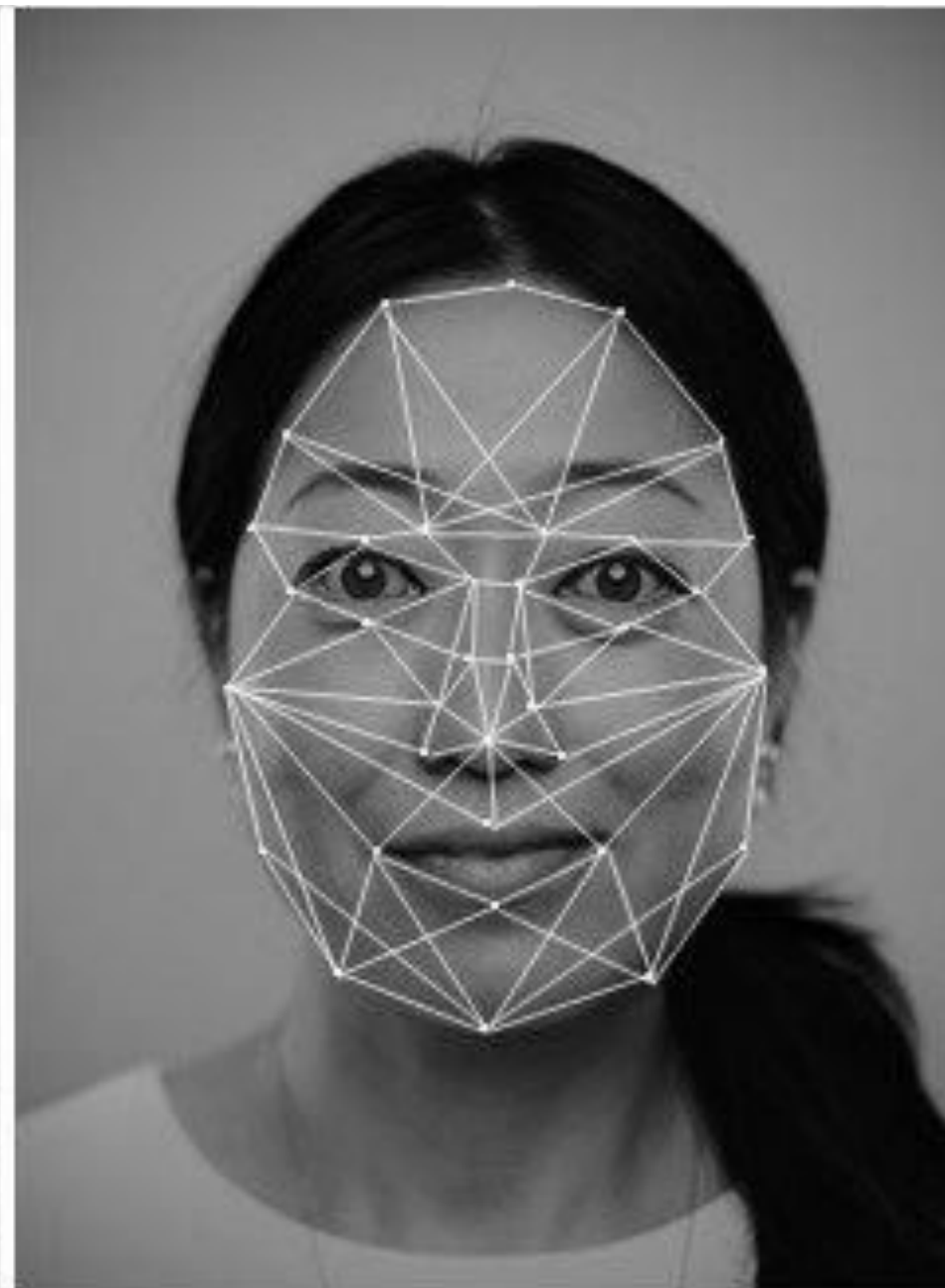
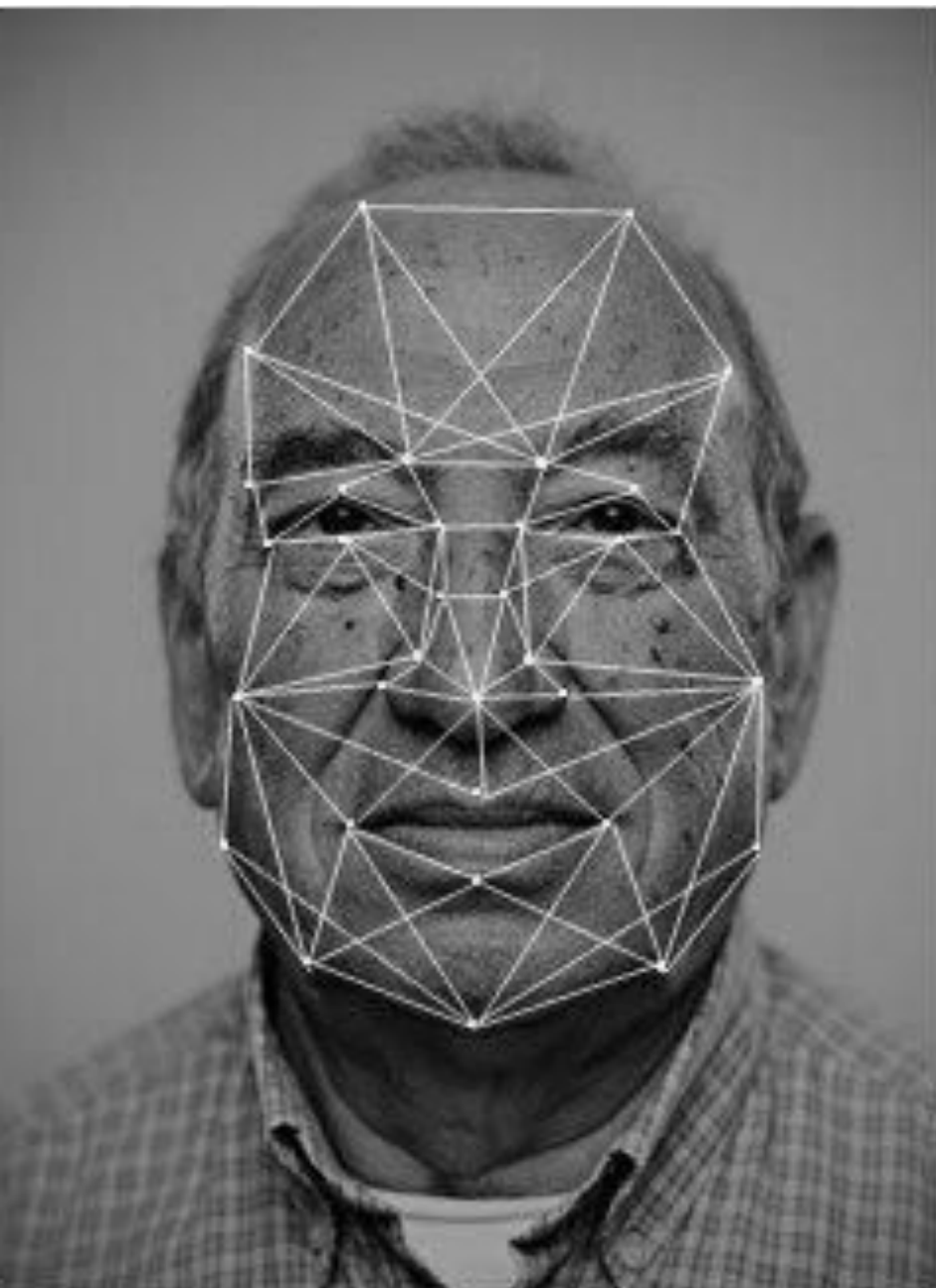
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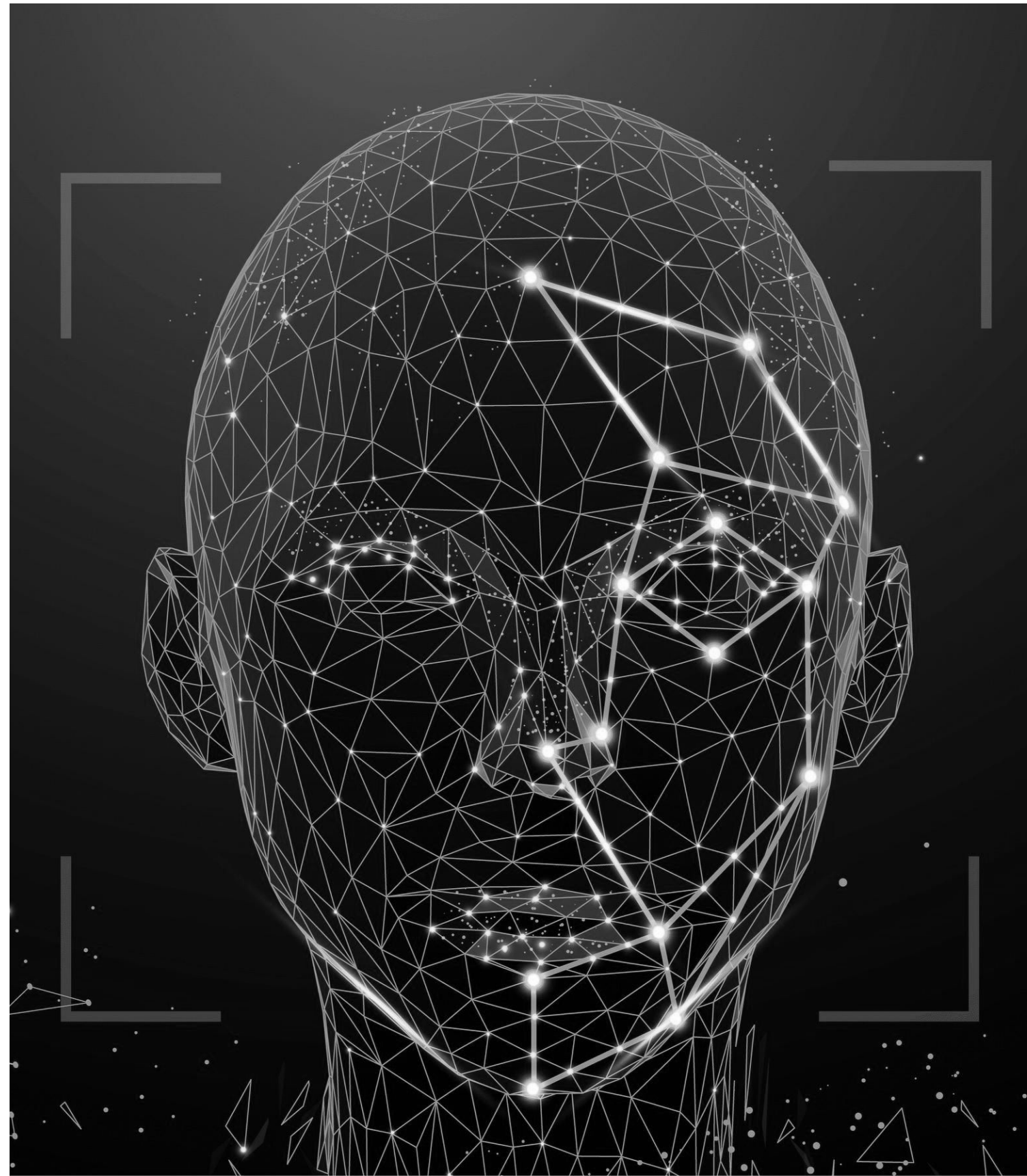
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Agenda



Intro/Demo

The basics of facial recognition with a demonstration.

Case Studies

Successes and failures of facial recognition in the real world.

Ethical Implications

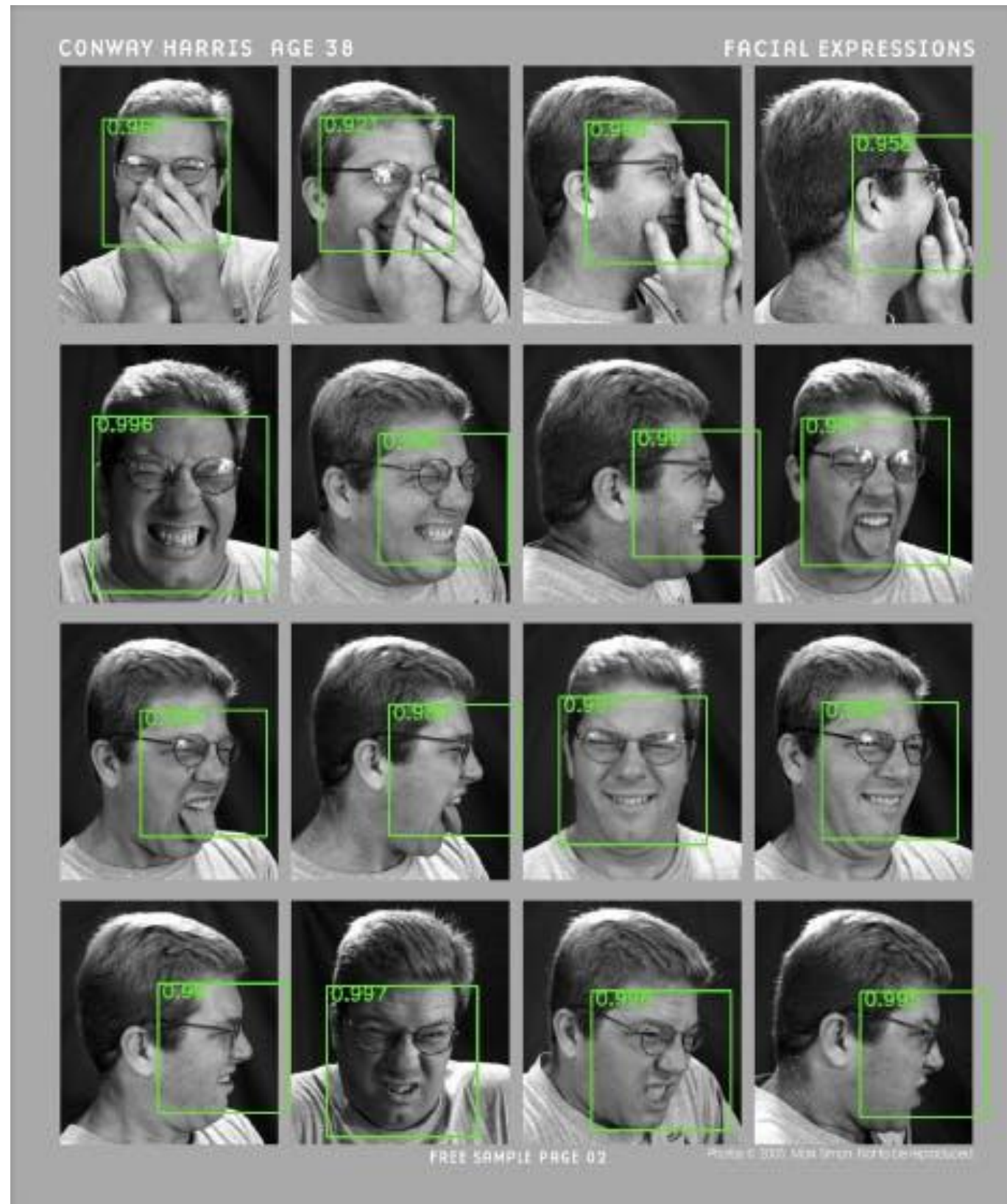
How does the usage of facial recognition concern us?

Solutions

What can be done to alleviate the ethical concerns?




Introduction



Facial Recognition Overview

What?	<p>A type of artificial intelligence.</p> <p>Biometric technology to identify or verify a person.</p> <p>Detects and recognizes.</p> <p>Analyzes patterns and facial features.</p>
When?	<p>Earliest pioneers in the 1960s using manual calculations.</p> <p>Gained popularity in the 90s with automation.</p> <p>Prototypes for government use in the 2000s.</p> <p>In 2017 Apple releases Face ID.</p> <p>Rapidly evolving with modern ML and deep learning.</p>
Why?	<p>Enhances security (airports, borders, general public).</p> <p>Provides authentication (buildings, sensitive information).</p> <p>Surveillance (monitors and identifies individuals in real-time).</p> <p>Allows for personalization (retail, marketing, social media).</p>
How?	<p>Detects faces within an image or video.</p> <p>Aligns the face through detection of key features.</p> <p>Extracts features to create a faceprint.</p> <p>Compares faceprint to available database.</p> <p>Identifies or verifies individual based on best match metric.</p>



DEMO TIME

Case Studies



Delta Digital ID

Streamlining Airport Security



Operation Smile

Reuniting Missing Children in India



Amazon Rekognition

28 Congressmen Identified as Previously Arrested



UK Metropolitan Police

96% of Scans Identify Criminals



FOR BETTER

OR WORSE



Delta Digital ID

Background

In late 2023, Delta Airlines began to enhance security—and convenience—to its passengers by utilizing facial recognition to streamline security check-ins prior to their departures.

According to Delta Airlines, the algorithms used to identify passengers are “close to 99% accurate” and after usage, they “[do not] store or save any biometric information” (2023, Delta Inc.).

Currently, this procedure has been implemented in LAX, LGA, DTW, ATL, and JFK (2023, Delta Inc.).

How It Works

Passengers go to lines denoted with green “Digital ID” signs

At checkpoint, security directs them to look at camera in front of them

Face is captured and processed via encryption, and sent to US Customs and Border Patrol facial matching service for confirmation (verification against image gallery)

If not found, Delta can manually verify via ID



सत्यमेव जयते

गृह मंत्रालय MINISTRY OF HOME AFFAIRS



Operation Smile (MUSKAAN)

Background

Every year tens of thousands of children go missing in India. Many are trafficked to work in eateries, handicraft industries, brick kilns, factories, or into begging and brothels.

How It Works

Aims to tackle child labour and missing children. The app uses a regularly updated centralized database of images and identifies up to 80 points on a human face to find a match. It can match a million records per second. It also includes a name search tool to locate parents or the child's village using phonetics to account for common misspelling of names in records.

Results

Launched September 2014 and rescued 227 children in a month. By 2020 thousands of missing and trafficked children were reunited with their families. In just January 2020 scanned through more than 3,000 records and were able to reunite more than half.

Improvements

Caution over how they are storing the data.

Thousands of children rescued but still a struggle to return some home.

Amazon Rekognition

In 2016, Amazon launched its Rekognition software, a cloud-based computer vision platform aimed to extract information from provided images and videos. Some advertised companies that use this are Pinterest, PBS, and SDG&E.

Launch Date	2016
Usage	"Can analyze millions of images, streaming, and stored videos within seconds, and augment human review tasks with artificial intelligence (AI)" and "add pre-trained or customizable computer vision APIs to your applications without building machine learning (ML) models and infrastructure from scratch" (aws.amazon.com)
Controversies	Mismatching 28 members of Congress with mugshots, most notably civil rights leader John Lewis (D-GA) (Snow, 2018). Allowing nearly unlimited software/database access to 1,300 law enforcement agencies, including ICE (Hao, 2020).



UK Metropolitan Police

Background	Aimed to hunt down wanted offenders and reduce violence. Ran trials in London that cost more than 222,000 pounds.	Results	14 year old boy fingerprinted after misidentification. Police stopped people for wearing facial coverings or hoods. One man was fined for a public order offence after refusing to be scanned.
Trials	8 trials between 2016 and 2018 resulted in a 96% false positive rate. Software wrongly alerted police that a person passing through the scanning area matched a photo in their database. One area across two trials saw a 100% failure rate.	Contention	Human rights violation? Infringement on civil liberties?





Ethical Implications

// Facial Recognition is Accurate if You're a White Guy

— Steve Lohr, [New York Times](#)

The Ethical Concerns of Facial Recognition

From the examined case studies—both good and bad—there are limitations and concerns regarding the usage of facial recognition technology.

Biases

Contents of training sets used on models can be skewed to disproportionately represent marginalized groups, affecting how it will interact in real world situations.

Informed Consent

Data collection is mostly done through third parties, and as a result most data is gathered without the user's consent.

Ownership

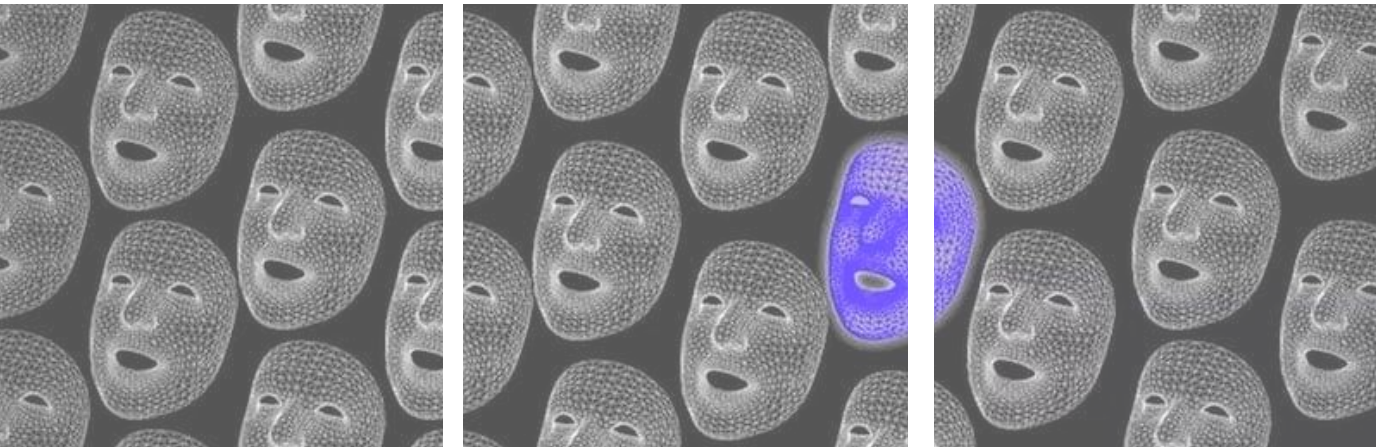
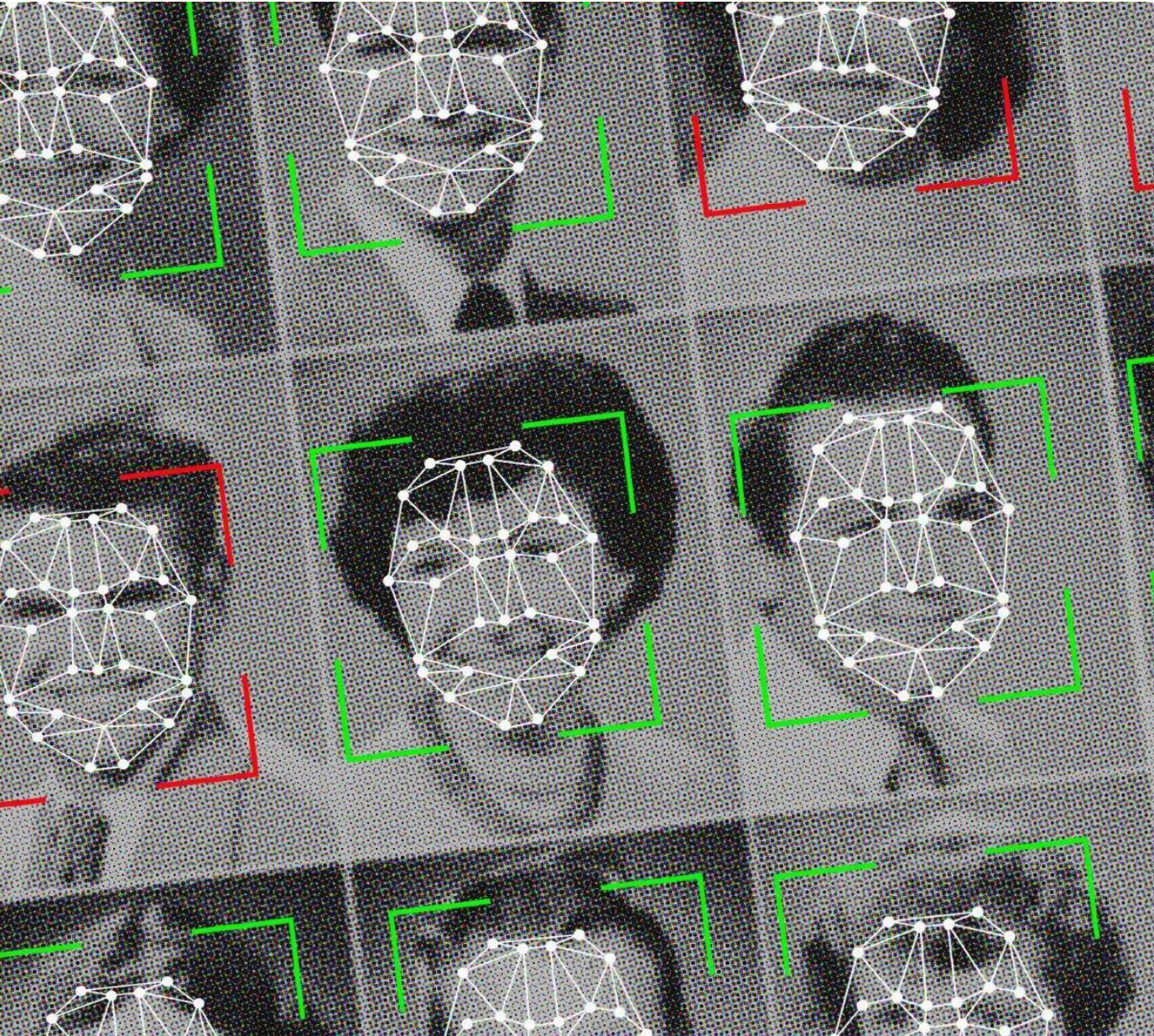
The legality of who owns what—especially online—is a grey area; you *physically* own your face, but when you post yourself, companies may claim ownership of your post.

Privacy

Regardless of data clearing techniques, your data will still exist somewhere on the cloud or Internet.



Solutions



Mitigating Ethical Concerns of Facial Recognition

Stricter government regulation on usage	Implement committees with those experienced in biometric technologies to regulate how corporations utilize facial recognition.
Ensuring end-to-end privacy preservations for users	Gain affirmative consent from those affected/data utilized from (e.g. Apple's app tracking consent in California) and design understandable/comprehensive protocols for users.
Checking bias through data collected/used	Ensure that data used to train and test facial recognition algorithms aren't disproportionately representing groups and skewing them to misidentify individuals.
Transparency of algorithms/data utilized	Establishing who and what is using FRT (e.g. vendors and their programs), as well as giving public access to documentation.



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